Application No. 10/019,425 Docket No.: 09621/000L180-US0

Amendment dated July 11, 2007 Reply to Office Action of April 18, 2007

**AMENDMENTS TO THE CLAIMS** 

1-10. (Canceled)

11. (Currently Amended) A tool holder attachment structure, for removably securing a tool

holder with a tool in a tapered attachment hole of main shaft of a machining tool, comprising:

a shank having a tapered outer perimeter surface;

said shank provided on said tool holder;

a plurality of elastic engagement pieces abutting an outer perimeter surface of said tapered

outer perimeter surface of said tool holder and being elastically deformable in a radial direction

during a fitting; and

a plurality of ring shaped grooves formed at said inner surface section of said attachment

hole of said main shaft at a predetermined interval along an axial center of said main shaft, said

plurality of ring shaped grooves and said plurality of elastic engagement pieces being arranged in an

alternating manner along said axial center;

said formation of said plurality of ring shaped grooves allowing said plurality of elastic

engagement pieces to be integrally formed with said main shaft;

said plurality of elastic engagement pieces disposed at an inner surface section of said

tapered attachment hole of said main shaft; and

said shank in said tapered attachment hole of said main shaft and said tool holder secured to

said main shaft during said fitting with said plurality of elastic engagement pieces elastically

deformed in said radial direction.

Application No. 10/019,425 Amendment dated July 11, 2007

Reply to Office Action of April 18, 2007

12. (Canceled)

13. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 12 11,

Docket No.: 09621/000L180-US0

wherein: said elastic engagement pieces are sloped relative to a plane perpendicular to said axial

center of said main shaft.

14. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 13,

wherein[[:]] toward an inner perimeter, said elastic engagement pieces are each sloped toward a

wider end of a tapered shape of said attachment hole.

15. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 12 11,

wherein[[:]] said elastic engagement pieces are formed parallel to a plane perpendicular to said axial

center of said main shaft.

16. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 14,

further comprising:

a plurality of grooves extending longitudinally along said tapered attachment hole being

formed at said inner surface section of said tapered attachment hole in a symmetrical arrangement

relative to said axial center.

17. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 11,

further comprising:

Application No. 10/019,425 Docket No.: 09621/000L180-US0 Amendment dated July 11, 2007

Reply to Office Action of April 18, 2007

an elastic flange extending radially from said tool holder abuts an outer end surface of said

main shaft and elastically deforms parallel with said axial center when said tool holder is mounted

on said main shaft.

18. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 16,

further comprising:

an elastic flange extending radially from said tool holder abuts an outer end surface of said

main shaft and elastically deforms parallel with said axial center when said tool holder is mounted

on said main shaft.

19. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 17,

further comprising:

a ring shaped groove being formed at a radially inward position on said elastic flange;

said elastic flange being formed with a ring shape; and

a ring shaped sloped groove being formed at a radially outward position on said elastic

flange.

20. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 11,

wherein[[:]] said plurality of elastic engagement pieces are a plurality of collar shaped members

secured to said inner surface section of said tapered attachment hole of said main shaft.

Application No. 10/019,425 Docket No.: 09621/000L180-US0 Amendment dated July 11, 2007

Reply to Office Action of April 18, 2007

21. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 11,

wherein[[:]] a cross section shape of said tapered attachment hole and said shank along a plane

perpendicular to said axial center is a non circular shape effective to transfer a rotational torque

during a use of said tool, whereby said rotational torque is transferred from said tapered attachment

hole of said main shaft to said shank without using a key.

22. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 16,

wherein[[:]] a cross section shape of said tapered attachment hole and said shank along a plane

perpendicular to said axial center forms a non circular shape effective to transfer a rotational torque

during a use of said tool, whereby said rotational torque is transferred from said tapered attachment

hole of said main shaft to said shank without using a key.

23. (Currently Amended) A tool holder attachment structure, for removably securing a tool

holder with a tool to a main shaft of a machining tool, comprising:

at least a shank on said tool holder;

said shank having at least a tapered outer perimeter surface;

said main shaft including a tapered attachment hole;

means for elastically securing said shank in said attachment hole of said main shaft and

eliminating vibration and attachment failure during a use of said machining tool and said tool holder

attachment;

at least a plurality of elastic engagement pieces in said means for elastically securing;

Application No. 10/019,425 Amendment dated July 11, 2007

Reply to Office Action of April 18, 2007

said elastic engagement pieces arrayed concentrically around an inner perimeter section of

Docket No.: 09621/000L180-US0

said attachment hole;

said elastic engagement pieces extending away from said main shaft and elastically abutting

said tapered outer perimeter surface of said shank during an insertion of said shank into said

attachment hole; and

said elastic engagement pieces elastically deforming in at least a first radial direction during

said insertion and said use, whereby said means for elastically securing enables said elastic

engagement pieces to absorb a plurality of use vibrations while maintaining a secure attachment

between said main shaft and said tool holder;

a plurality of ring-shaped grooves on said inner perimeter section of said attachment hole;

said plurality of ring-shaped grooves arrayed alternatingly with respective said elastic

engagement pieces in an axial direction along said inner perimeter section of said attachment hole;

said plurality of ring-shaped grooves including smooth radius contours at bottom portions

thereof, thereby minimizing elastic stress concentration; and

said plurality of elastic engagement pieces extending integrally from said main shaft, thereby

simplifying manufacturing and assembly of said main shaft and said tool holder with a uniform

force.

24. (Canceled)

25. (Currently Amended) [[A]] The tool holder attachment structure, according to claim 24 23,

wherein:

Application No. 10/019,425 Docket No.: 09621/000L180-US0

Amendment dated July 11, 2007

Reply to Office Action of April 18, 2007

said plurality of elastic engagement pieces, each having a first length, extends from each

respective ring-shaped groove to respective said inner perimeter section of said tapered attachment

hole;

an end of each said elastic engagement piece arrayed in a plane parallel to said tapered outer

perimeter surface of said shank, whereby each said elastic engagement piece contacts said tapered

outer perimeter surface simultaneously during said insertion to provide easy alignment and tight

attachment; and

said first length of each respective said elastic engagement piece being dependant upon a

position on said tapered attachment hole relative to said tapered outer perimeter surface of said

shank.